

Tribal Renewable Energy Program Review

USDA

October 25, 2010

Denver, Colorado.



Committed to the future of rural communities.

President Obama's Commitment to Renewable Energy

“To put people back to work today, reduce our dependence on foreign oil, together we will double our renewable energy production.”



Complimentary Efforts

- Biomass R&D Initiative Board
- Biofuels Interagency Workgroup
- Growing America's Fuels
- Farm Bill Title IX Renewable Energy
- America Recovery and Reinvestment Act
- Memorandum of Understanding: Department of Navy
- Copenhagen Memorandum of Understanding
- Farm to Fly Initiative

“USDA is working to expand energy opportunities by producing alternative forms of energy and fuel, and to ensure that we are doing the research necessary to allow agriculture to transition away from its rather significant dependence on fossil fuels.”

Tom Vilsack
Agriculture Secretary



Secretary Vilsack

National Press Release

October 21, 2010

- Our country needs a strong, vibrant rural economy. Unfortunately, over the past several decades there have been times when it was neither strong nor vibrant. Persistent high unemployment and poverty encouraged many to leave their rural communities. A majority of rural counties lost population, and with it came a loss of political representation.
- President Obama refuses to accept the notion that Rural America's past predicts its future. He recognizes that the source of America's innovative spirit and our enduring values remain rooted in our rural areas.
- The President's vision for a revitalized rural economy that creates real opportunity for growth and prosperity centers on our ability to add innovative technologies, open new markets for crops, and better utilize our natural resources. The President ordered USDA to make that vision a reality.



Rural Development Programs

- USDA Rural Development supports and administers over 40 programs and manages a portfolio of \$114 billion
- RD Programs invest in:
 - Advanced and Traditional Biofuels;
 - Renewable Energy Systems,
 - Energy Efficiency Improvements,
 - Energy Audits and Renewable Energy Development Assistance,
 - Feasibility Studies, and
 - Business & Industry Green Technologies

2008 Farm Bill Title IX and USDA PROGRAMS



- **Section 9003: Biorefinery Assistance Program** –
 - Provides **loan guarantees** of up to \$250 million for the development, construction and retrofitting of commercial-scale bio-refineries
- **Section 9004: Repowering Assistance** –
 - Provides **payments** to existing bio-refineries to replace fossil fuels used to produce heat or power to operate the bio-refineries with renewable biomass.
- **Section 9005: Bioenergy Program for Advanced Biofuels** –
 - Provides **payments** to eligible agricultural producers to support and ensure an expanding production of advanced bio-fuels
- **Section 9007: Rural Energy for America (REAP)**–
 - Provides grants and loan guarantees to support energy efficiency improvements and develop renewable energy systems
- **Section 9008: Biomass Research and Development Initiative** –
 - Provides grants to support R&D and Demonstration efforts for feedstock, biofuel, bioproducts; and analysis for sustainable strategic guidance
- **Section 9011: Biomass Crop Assistance Program (BCAP)** –
 - Provides support to establish and produce crops for conversion to bioenergy and help with the collection, harvest, storage, and transportation of material to biomass conversion facility.

7 Strategies

- Regional Collaboration
- Regional Food Systems
- Community Building
- Renewable Energy Opportunity
- Broadband & Business Creation
- Strategic Partners & Cooperatives
- Capital Markets

USDA RD

- National Office DC
- 47 State Offices
 - Renewable Energy Coordinator
 - Business & Coop Director / Specialists
 - Engineer
 - Architect
 - Environmental Coordinator



500 Local & Satellite Offices

Renewable Energy System/Energy Efficiency Improvement Grants and Loans Specific Technology Categories

- **Biomass, digesters**
- **Biomass, bioenergy**
- **Geothermal, electric**
- **Geothermal, direct use**
- **Hydrogen**
- **Hydrokinetic**
- **Solar, small**
- **Solar, large**
- **Wind, small**
- **Wind, large**
- **Energy Efficiency Improvements**

Business, Cooperative, & Renewable Energy Programs

- Business & Industry Loan Guarantee
- Renewable Energy Loans Guarantee: 9007-REAP
- Renewable Energy Grants: 9007
- Energy Efficiency Grants: 9007
- Intermediary Relending Program
- Biomass Research & Development & Demonstration Initiative Grant: 9008
- Value Added Producer Grant
- Biorefinery Assistance: 9003
- Bioenergy Program for Advanced Biofuels: 9005

Renewable Opportunity

- **All inclusive**
- **National Security**
- **Rural Economic Development: Jobs, technological advancement, business retention & expansion, local \$ retention, multiplier effect**
- **Alleviate Poverty**
- **Lower energy costs**
- **Hedge against fossil fuel price increases**
- **Protect the environment**

Solution

A rural landscape featuring a large field of bright yellow flowers in the foreground. In the middle ground, there is a small, dark-roofed barn or shed. The background shows a hillside with a plowed field, creating a pattern of curved furrows.

- **Conservation**
- **Energy efficiency**
- **Develop Renewable Energy Supply**

Approach

- 9008 Research Development & Demonstration
- 9003 Biorefinery Assistance - Scale up to commercial
- 9007 Renewable Energy Systems & Energy Efficiency Improvements, Energy Audits, Feasibility Studies, RE Development Assistance
- 9004 Repowering Assistance
- 9005 Bioenergy Program for Advanced Biofuels
- 9009 Renewable Energy Self Sufficiency Initiative
- 9011 Biomass Crop Assistance Program
- B&I Business and Industry



• VAPG Value Added Producer Grant



Algae





Committed to the future of rural communities.

Algae





Committed to the future of rural communities.

Pyrolysis

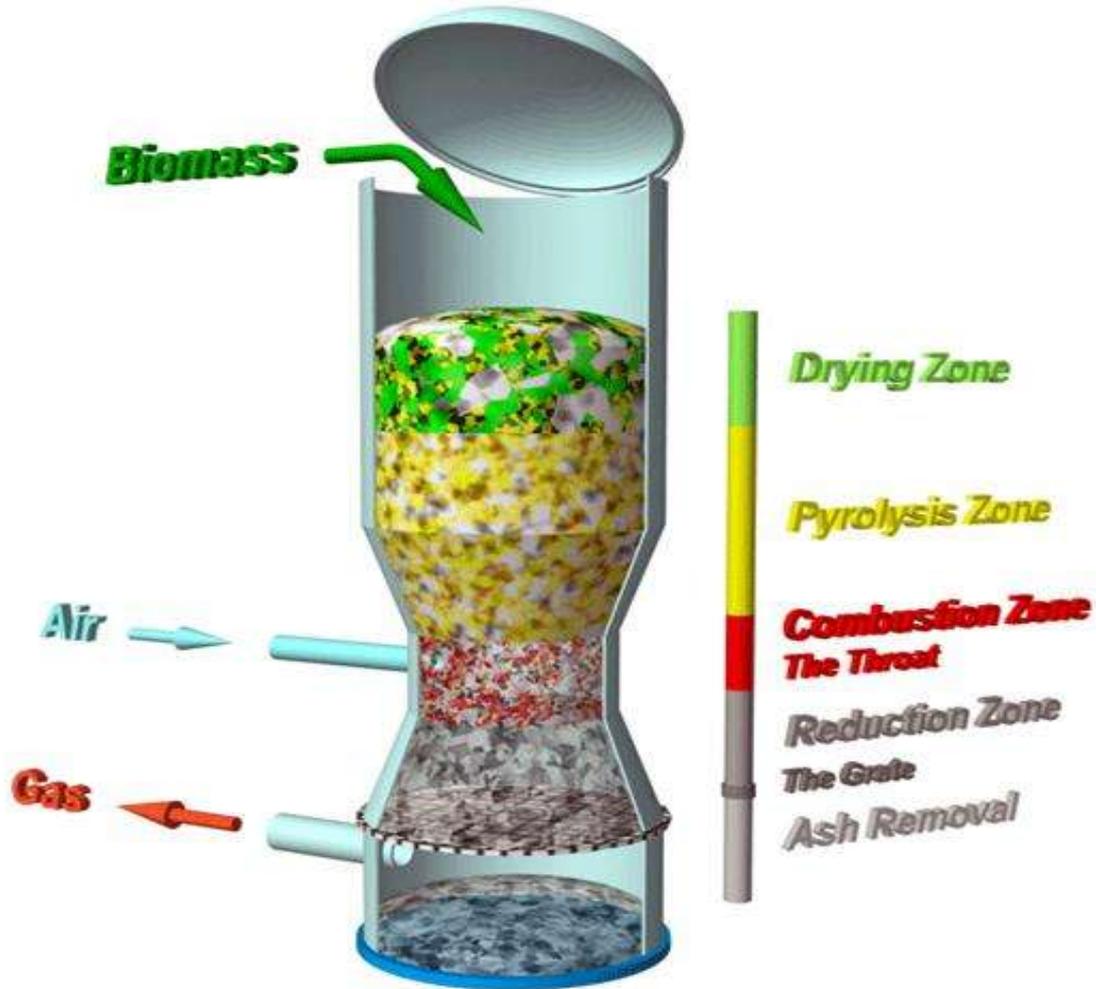


Biochar





Gasification



Feedstock Diversification



Feedstock Diversification



Feedstock Diversification



Feedstock Densification



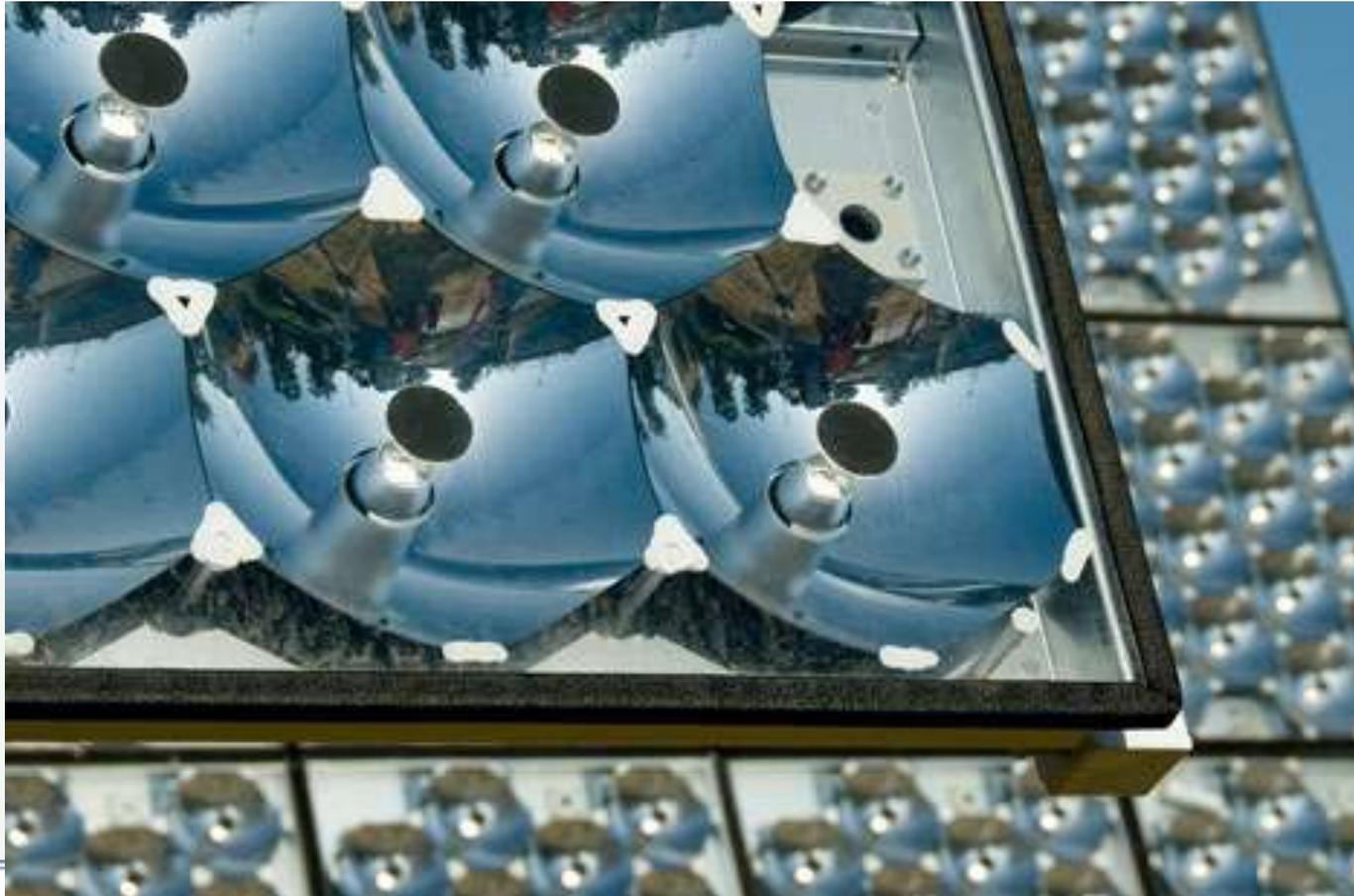




Concentrated



Consolidator



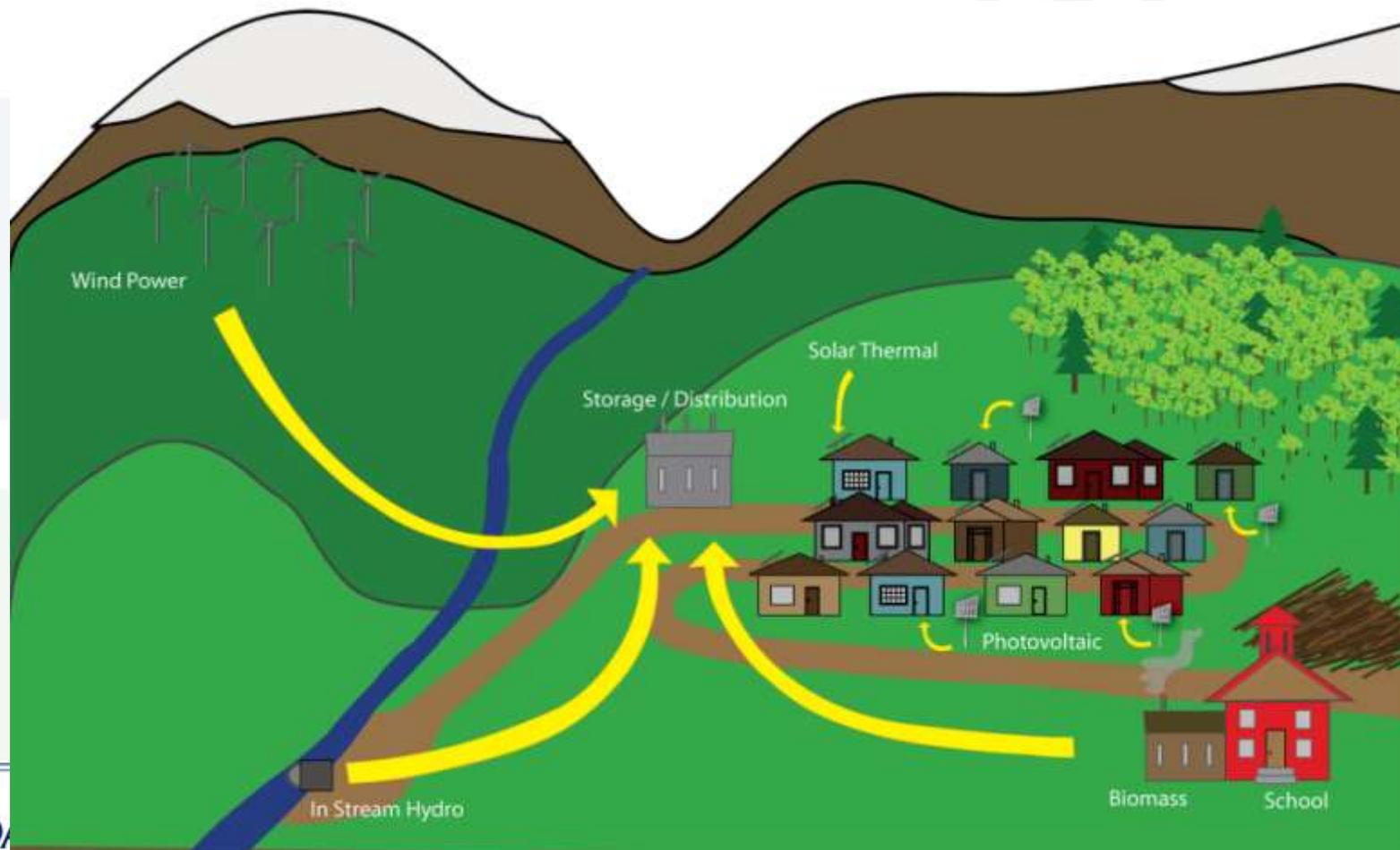
Consolidator



Thermal Photovoltaic



Renewable Energy Hybrids



Energy Efficiency

- Greenhouses



Advanced Aviation Biofuels



Advanced Aviation Biofuels



Advanced Aviation Biofuels





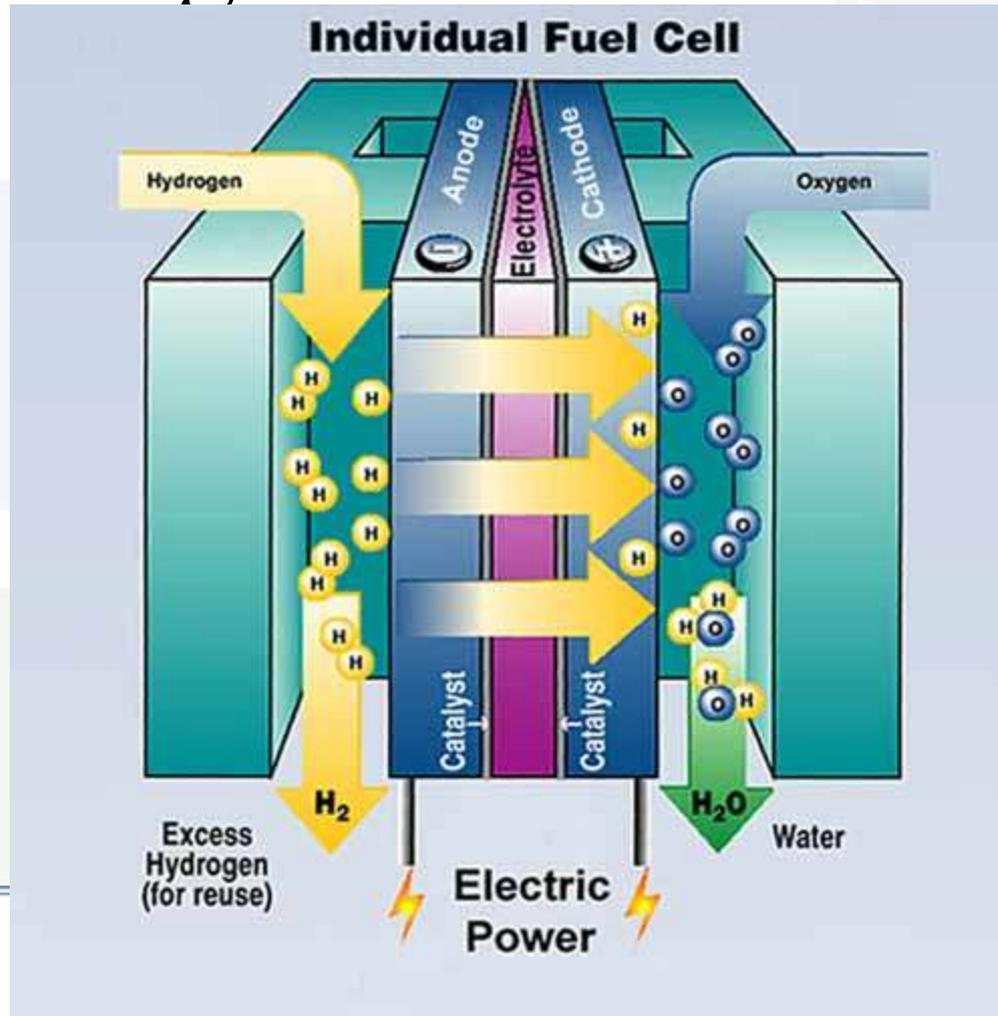
Cellulosic

- Ethanol
- Alcohols
- Butanol
- Methanol

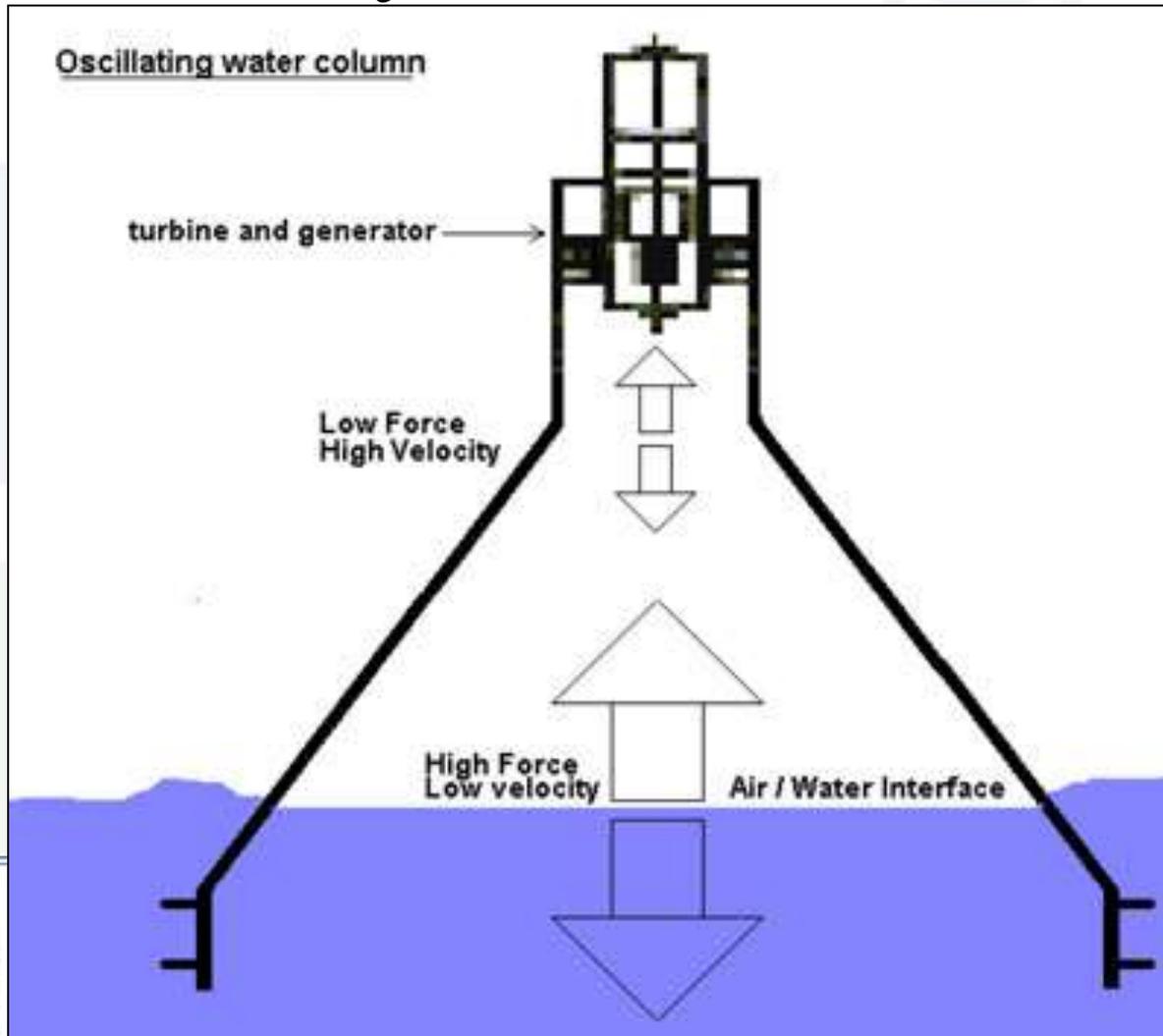
Cellulosic



Hydrogen from Renewables



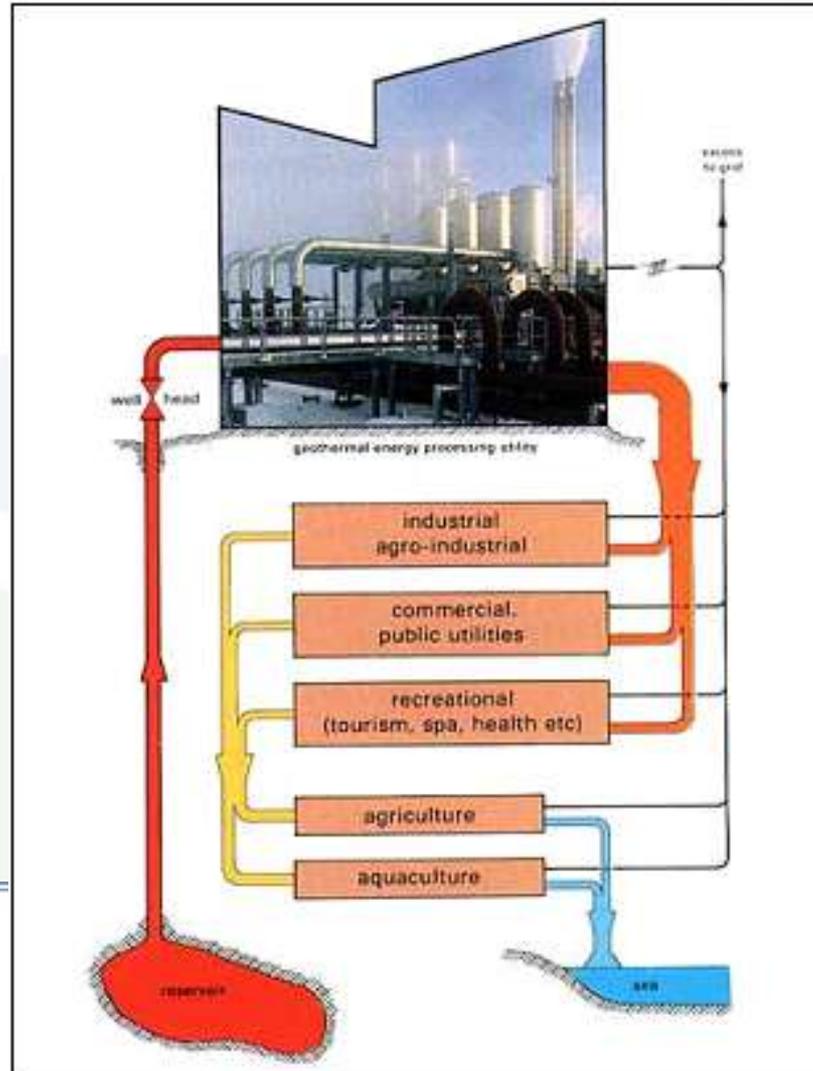
Hydrokinetic



Micro Hydro



Geothermal Direct



Geothermal





Community

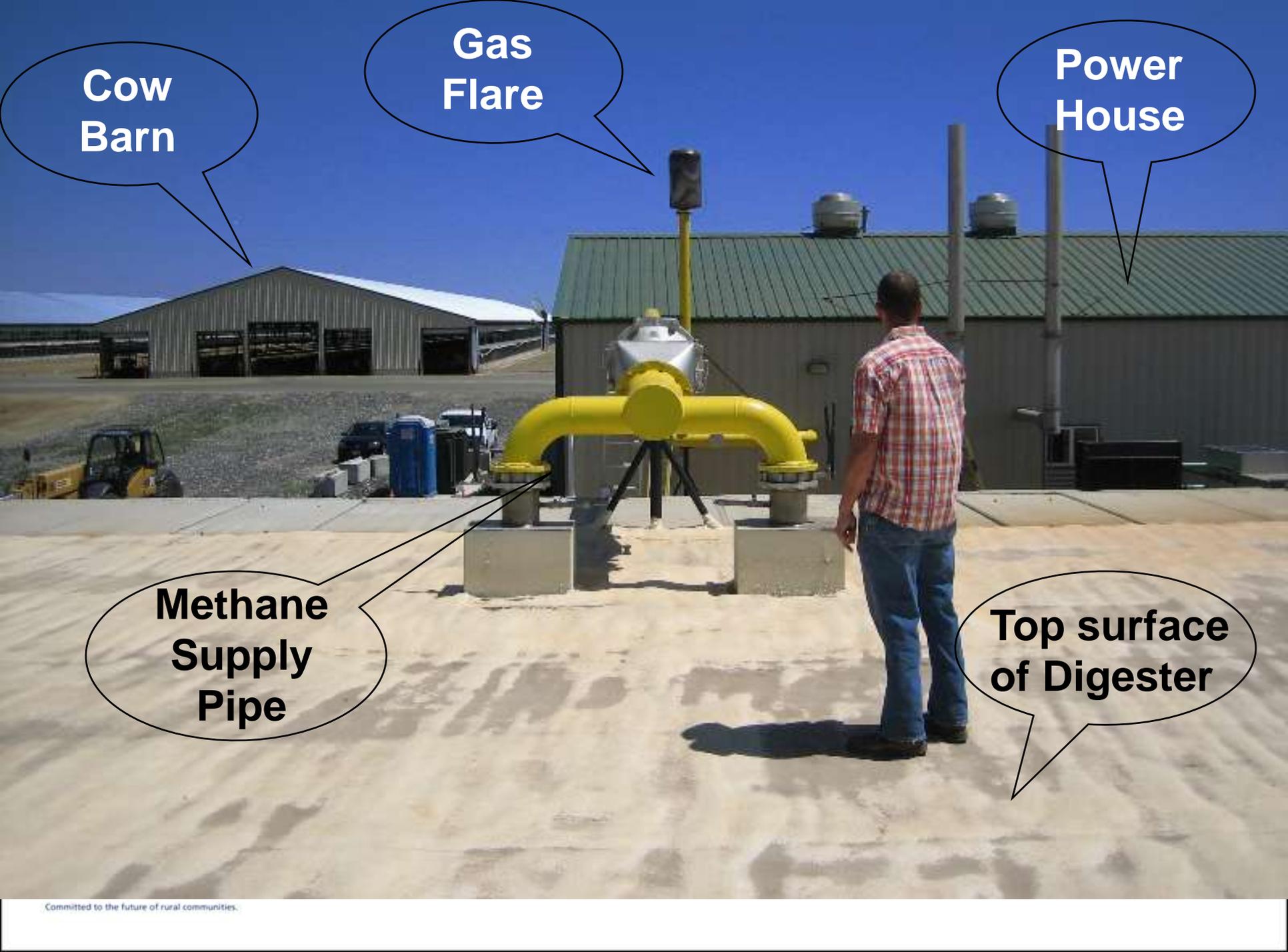


Anaerobic Digesters

- On farm: Dairy, Swine, Poultry
- Mixed substrates
- Business
- Community

Anaerobic Digesters





**Cow
Barn**

**Gas
Flare**

**Power
House**

**Methane
Supply
Pipe**

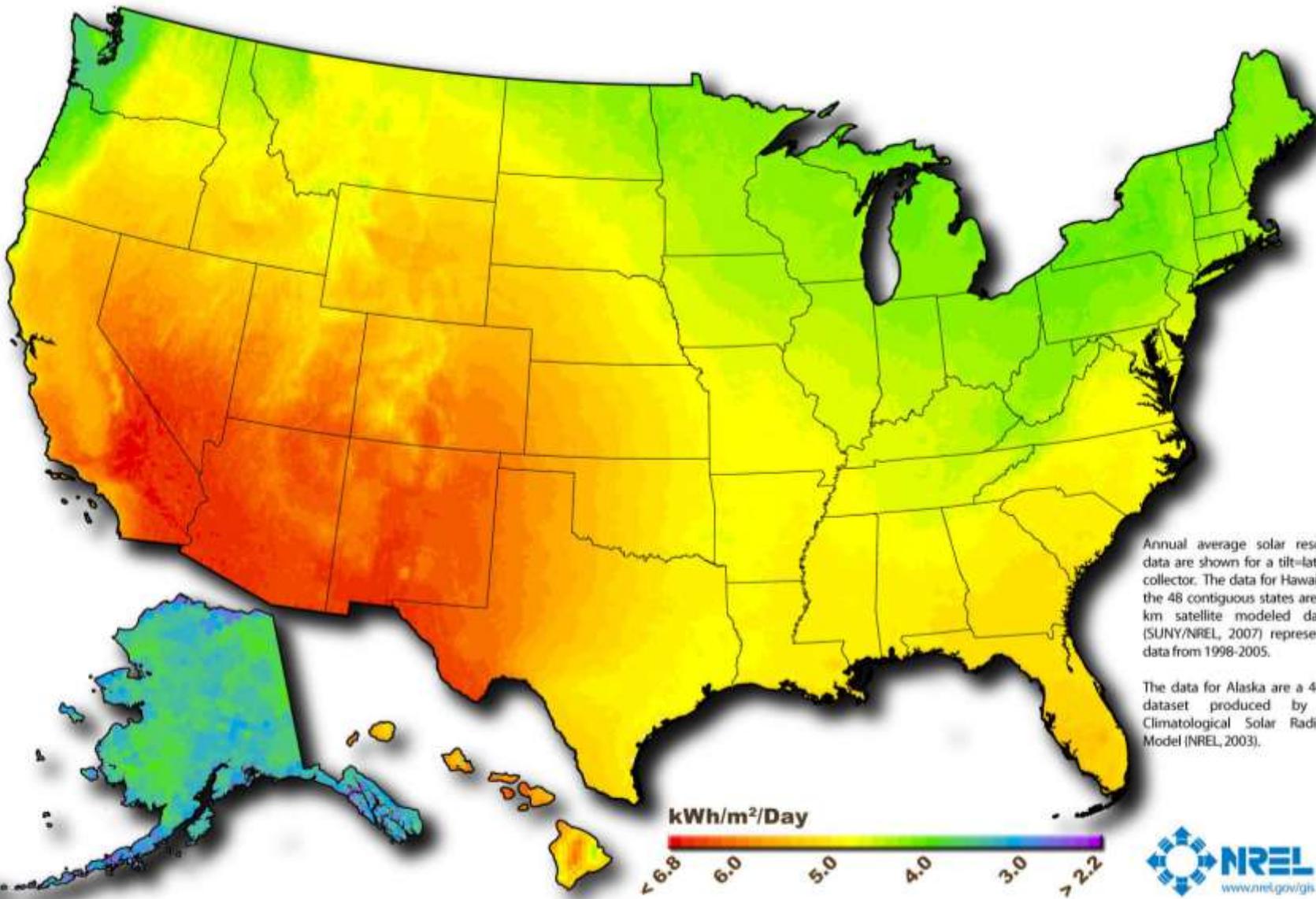
**Top surface
of Digester**

Energy Efficiency

- Structures
- Materials
- Processes
- Machinery
- Equipment

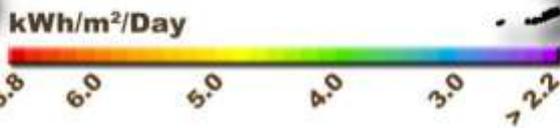
Energy Efficiency



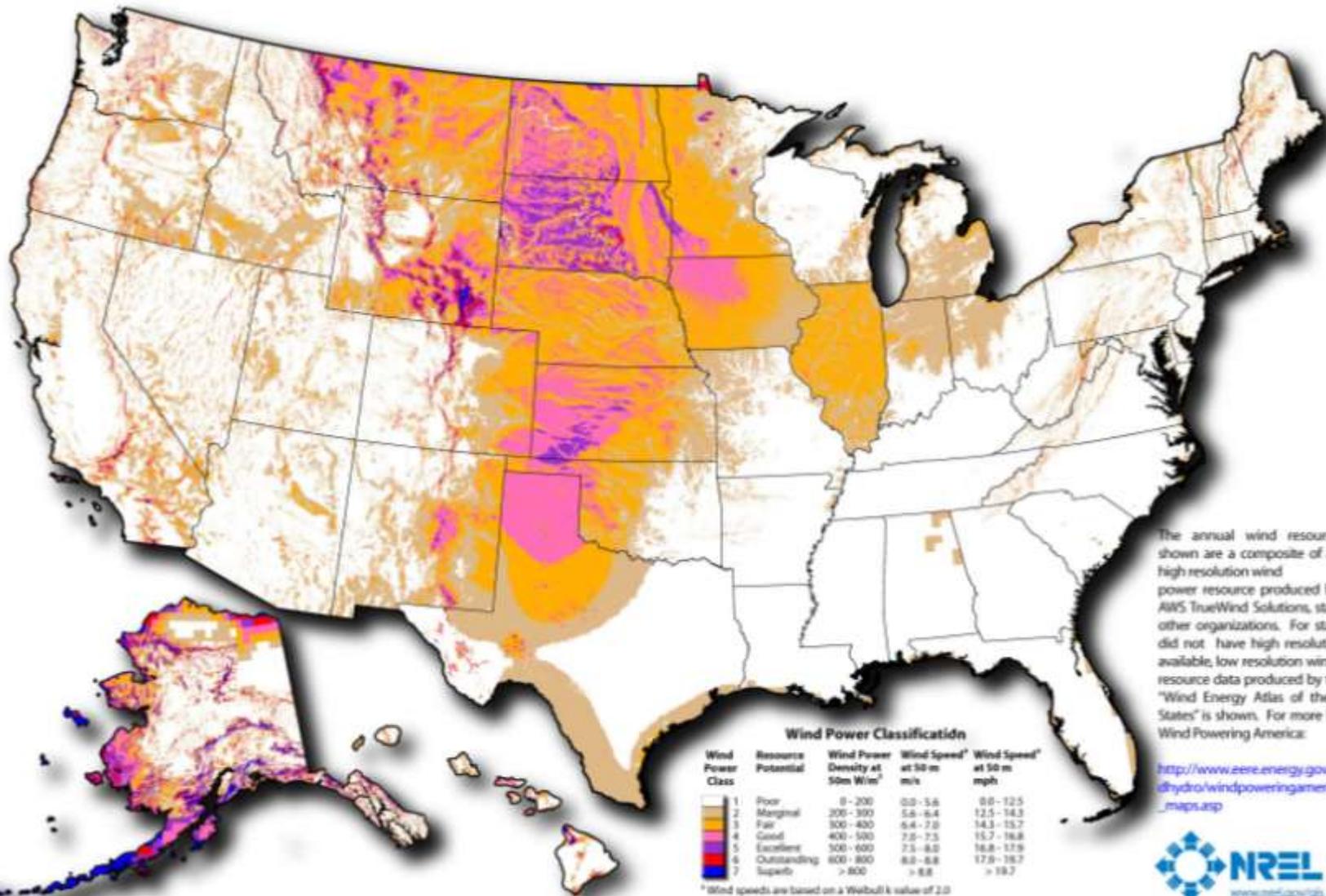


Annual average solar resource data are shown for a tilt-latitude collector. The data for Hawaii and the 48 contiguous states are a 10 km satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.

The data for Alaska are a 40 km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).



U.S. Wind Resource (50m)



The annual wind resource data shown are a composite of available high resolution wind power resource produced by NREL, AWS TrueWind Solutions, states, and other organizations. For states that did not have high resolution data available, low resolution wind power resource data produced by the 1987 "Wind Energy Atlas of the United States" is shown. For more info, visit Wind Powering America:

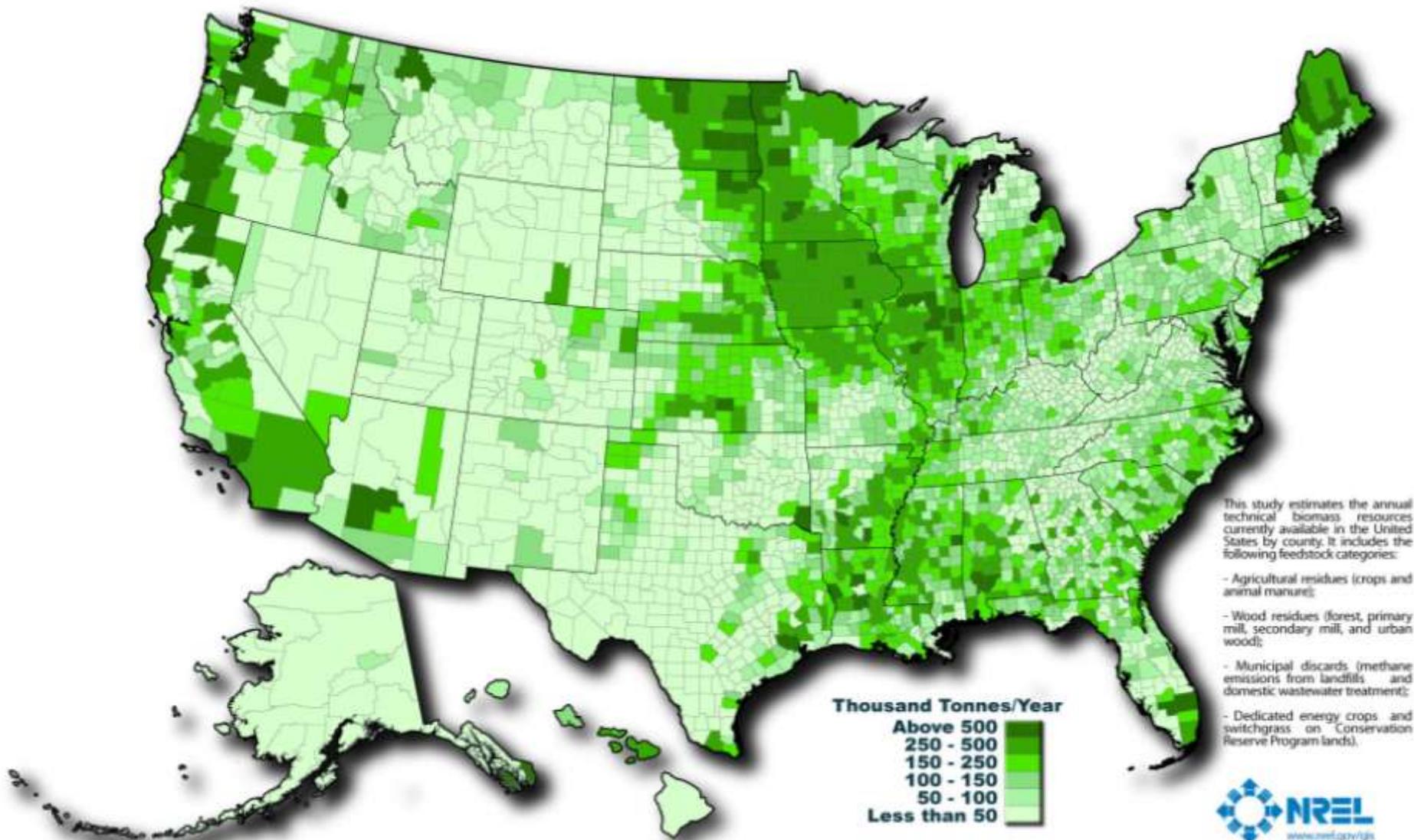
http://www.eere.energy.gov/wind/and/ohydro/windpoweringamerica/wind_maps.asp



Author: Billy Roberts - December 12, 2008

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.

U.S. Biomass Resource



This study estimates the annual technical biomass resources currently available in the United States by county. It includes the following feedstock categories:

- Agricultural residues (crops and animal manure);
- Wood residues (forest, primary mill, secondary mill, and urban wood);
- Municipal discards (methane emissions from landfills and domestic wastewater treatment);
- Dedicated energy crops and switchgrass on Conservation Reserve Program lands.



This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.
See additional documentation for more information at <http://www.nrel.gov/docs/fy06osti/39181.pdf>

Section 9003 - Biorefinery Assistance Program

- Provides loan guarantees for commercial scale biorefineries that produce advanced biofuels
- Guaranteed Loan Limitations:
 - Up to \$250 Million for Biorefineries
- **FY 2010 funding with 2009 carryover \$503 million**

Section 9003 Biorefinery Assistance Program

Investments to date

“First of its kind” scale up to commercial size applications:

- **Range Fuels Inc.**, Soperton, Georgia for \$80 million, 1/16/09
- **Sapphire Energy**, Columbus, New Mexico, \$54.5 million, 12/4/09



Range Fuels, Soperton, GA

First commercial-scale cellulosic biorefinery



- 20 MGY (USDA/DOE-funded Project; expected ~ 100 MGY)
- Thermo-chemical process -- combines pressure, heat, steam, and biomass to produce synthesis gas, or syngas, a mixture of hydrogen and oxygen that can be converted to a wide range of products
- Jobs -- 250 at peak construction; 70 plant employees at full capacity

Sapphire Energy, Columbus, NM

First 3rd generation biorefinery

Will produce 1 MMGY

USDA/DOE-funded Project

Fix approximately 56 metric tons of
CO₂ per day

Demonstrates that algal oil can be
refined to produce gasoline, diesel,
and jet fuel

Completed with Boeing, the first 2-
engine 737-800 2-hour test flight
using synthetic algal based jet fuel

Jobs –

750 direct and indirect jobs by 2011
and more than 16,000 by 2030;

30 green collar jobs to develop and
operate facility



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